1. (Once amended) An apparatus for conducting electrophysiological measurements on cells comprising a measuring head provided with at least one electrode for impaling said cells wherein said electrodes are integrated into a common support.

2. (Once amended) The apparatus of claim 1 wherein said electrodes are inserted into recesses within said support.

3. (Once amended) The apparatus of claim 1 wherein said electrodes are molded into said support.

A1

4. (Once amended) The apparatus of claim 1 wherein said electrodes consist of pulled glass tubes.

5. (Once amended) The apparatus of claim 1 wherein said electrodes have an electrical resistance of between 5 MΩ and 100 MΩ.

6. (Once amended) The apparatus of claim 1 wherein said electrodes have an electrical resistance of between 500 kΩ and 5 MΩ.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

7. (Once amended) The apparatus of claim 1 wherein said electrodes are configured as wire electrodes.

8. (Once amended) The apparatus of claim 7 wherein said electrodes are configured as silver wire electrodes.

9. (Once amended) The apparatus of claim 8 wherein said electrodes are configured as silver wire electrodes provided with a chloride coating.

A1 10. (Once amended) The apparatus of claim 1 wherein at least one electrode has a straight section.

11. (Once amended) The apparatus of claim 1 wherein at least one electrode is provided with a tip at its front terminal end.

12. (Once amended) The apparatus of claim 1 wherein two electrodes are arranged essentially symmetrical relative to a longitudinal axis of said carrier.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

13. (Once amended) The apparatus of claim 12 wherein said electrodes have a distance d at their free terminal end being between 50 μm and 800 μm.

14. (Once amended) The apparatus of claim 12 wherein at least one electrode has a straight section, said straight section enclosing an acute angle α with a longitudinal axis of said support.

15. (Once amended) The apparatus of claim 14 wherein said acute angle α is between 3° and 10°.

A1

16. (Once amended) The apparatus of claim 1 wherein said at least one electrode is configured as a measuring electrode.

17. (Once amended) The apparatus of claim 16 wherein said at least one measuring electrode is coupled to a measuring amplifier.

18. (Once amended) The apparatus of claim 17 wherein said measuring amplifier is adapted to be adjusted.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

19. (Once amended) The apparatus of claim 1 wherein said at least one measuring electrode is connected to a current source.

20. (Once amended) The apparatus of claim 19 wherein said current source is adapted to be adjusted.

21. (Once amended) The apparatus of claim 1 wherein said at least one electrode is configured as a reference electrode.

22. (Once amended) The apparatus of claim 21 wherein said reference electrode is connected to ground.

A1

23. (Once amended) The apparatus of claim 2 wherein two measuring electrodes and two reference electrodes are provided.

24. (Once amended) The apparatus of claim 16 wherein said at least two measuring electrodes are arranged in a first common plane.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

25. (Once amended) The apparatus of claim 21 wherein at least two reference electrodes are arranged in a second common plane.

26. (Once amended) The apparatus of claim 24 wherein said first and said second plane extend parallel to each other and wherein at least two reference electrodes are arranged in a second common plane.

27. (Once amended) The apparatus of claim 1 wherein at least one perfusion conduit is arranged on said carrier.

A1

28. (Once amended) The apparatus of claim 27 wherein at least one perfusion conduit is a perfusion outlet.

29. (Once amended) The apparatus of claim 16 wherein said perfusion inlet has a first end opening, said perfusion inlet being arranged essentially parallel with said at least one measuring electrode, said first end opening being located above a lower end of said at least one measuring electrode.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

30. (Once amended) The apparatus of claim 14 wherein said perfusion inlet is arranged essentially on a symmetry axis between said measuring electrodes and wherein said perfusion inlet has a first end opening, said perfusion inlet being arranged essentially parallel with said at least one measuring electrode, said first end opening being located above a lower end of said at least one measuring electrode.

31. (Once amended) The apparatus of claim 27 wherein said perfusion inlet is connected to a conveyor pump.

A1 32. (Once amended) The apparatus of claim 31 wherein said pump is adapted to be adjusted.

33. (Once amended) The apparatus of claim 27 wherein said perfusion inlet is adapted to be connected to a plurality of storage containers via a controllable valve system.

34. (Once amended) The apparatus of claim 33 wherein said storage containers are arranged above said perfusion inlet.

35. (Once amended) The apparatus of claim 33 wherein said at least one storage container contains a test liquid.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

36. (Once amended) The apparatus of claim 33 wherein said at least one storage container contains a rinsing liquid.

37. (Once amended) The apparatus of claim 27 wherein said perfusion conduit is a perfusion outlet.

38. (Once amended) The apparatus of claim 29 wherein said perfusion outlet has a second end opening, said second end opening being located above the first end opening and wherein said perfusion conduit is a perfusion outlet.

A1 39. (Once amended) The apparatus of claim 38 wherein said end openings are oriented along opposite directions.

40. (Once amended) The apparatus of claim 37 wherein said perfusion outlet is connected to a suction pump.

41. (Once amended) The apparatus of claim 40 wherein said suction pump is adapted to be adjusted.

42. (Once amended) The apparatus of claim 26 wherein, as viewed on first plane, said perfusion inlet is located in front of

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

said first plane and said perfusion outlet is located behind said second plane and wherein said perfusion inlet has a first end opening, said perfusion inlet being arranged essentially parallel with said at least one measuring electrode, said first end opening being located above a lower end of said at least one measuring electrode and wherein said perfusion conduit is a perfusion outlet.

43. (Once amended) The apparatus of claim 1 wherein said at least one measuring head is arranged on an actuator, said actuator being adapted to be displaced along a coordinate system above a receptacle for said cells.

A1

44. (Once amended) The apparatus of claim 43 wherein said actuator carries a plurality of measuring heads.

45. (Once amended) The apparatus of claim 44 wherein said measuring heads are adapted to be displaced individually relative to said actuator along said axis z directed towards said cell.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

46. (Once amended) The apparatus of claim 43 wherein said measuring head is affixed to said actuator by plugging or screwing.

47. (Once amended) The apparatus of claim 1 wherein means are provided for injecting cDNA and/or mRNA into said cell.

48. (Once amended) The apparatus of claim 47 wherein said means are located on said actuator.

49. (Once amended) The apparatus of claim 43 wherein said receptacle for said cell is configured as a standardized multi-well-plate.

50. (Once amended) The apparatus of claim 49 wherein said individual receptacles within said plate are provided with a readable code, said actuator comprising means for reading said code.

51. (Once amended) The apparatus of claim 50 wherein said code is a bar code, said means being a bar code reading head.

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

52. (New) The apparatus of claim 13 wherein said distance d is between 200 μm and 500 μm.

53. (New) The apparatus of claim 15 wherein said acute angle α is 5°.

A1

WEINGARTEN, SCHURGIN,
GAGNEBIN & HAYES, LLP
TEL. (617) 542-2290
FAX. (617) 451-0313